

# EXAM REVIEW

SANFORD

Chem 111/112-Exam Review Problems
<u>Half-Life Problems</u> (Chem 111 only)
1. When will 17% of a sample remain if its half-life is 8 hours. Ans. 20.48h
2. If 63% of a sample is left after 16 years, find its half-life. Ans. 23.85 y
3. If you start with $5.32 \times 10^9$ atoms of Cs-129 (half-life= 32.1 h), how much time will pass before the amount is reduced to $2.60 \times 10^6$ atoms? Ans. 353 h
<u>Mass-Mass/mol-mol(Stoichiometry) Problems</u>
1. White phosphorous combines directly with iodine to form dark-red phosphorous triiodide. If 77.5 g of phosphorous is combined with iodine, how many moles of phosphorous triiodide is formed?
2. In the metallurgy of iron, the iron ore $\text{Fe}_2\text{O}_3$ is converted to iron and carbon monoxide by reacting the ore with coke or C. How many moles of carbon monoxide would form if 0.500 kmol of $\text{Fe}_2\text{O}_3$ was reacted with sufficient coke? Ans. 1.5 kmol
3. Determine the number of litres of oxygen required for complete combustion of one litre of gasoline. Ans. 12.5 L
4. How many grams of lead (II) phosphate is formed when 8.6 grams of lead(II) sulfate reacts with Zinc phosphate. Ans.
<u>Sealed Flask</u>
5. A sealed flask contains 11.2 g of $\text{Na}_3\text{PO}_4$ . Find
1) mol of substance
2) mass of Oxygen
3) mol of Na
4) # of atoms of P
5) total # of atoms
<u>Electron Configuration</u>
6. Give the electron configuration for:
Sn
Zr
At

7. Fill in the table

	Atomic #	#protons	#electrons	Mass#	#of neutrons
K					
La					
$\text{I}^{1-}$					
$\text{Sr}^{2+}$					
Hg					
Rb					

8. Given 8.6 of  $\text{Pb}(\text{NO}_3)_4$ , find

a) moles b) #of particles

Ans. Ans.  $1.9 \times 10^{23}$

Solution/Concentration Calculations

1. If a chemist mixes 8.0 g of NaOH in 10.0 mL of water, find concentration. Ans 20 mol/L

2. A chemist dilutes a concentrated HCl(aq) solution by mixing 6.0 mL of the concentrated HCl in 200.0 mL of water. Find the concentration of the newly prepared solution. Ans. 0.348 mol/L

3. Explain, using calculations how to make a 3.2 mol/L nitric acid solution from a concentrated solution of nitric acid. The size of the flask that you are using is 100 mL. Ans.

4. How many grams of NaOH are required to make a 0.20 mol/L solution? Ans.

VSEPR

1. Draw a structural diagram and Lewis dot diagram for the following. Also give the name of the shape, polarity and # of bonding pairs and # of lone pairs for the central atom.

A)  $\text{NH}_3$  B)  $\text{AsF}_4\text{Cl}$  C)  $\text{CH}_3\text{OH}$  D)  $\text{CO}_2$  E)  $\text{H}_2\text{S}$  F)  $\text{SCl}_6$

Gas Problems

1. Determine the final pressure of steam that is converted from  $1.00 \times 10^4$  L at 600 KPa and  $150^\circ\text{C}$  to  $1.80 \times 10^4$  L at  $110^\circ\text{C}$ . Ans. 302 Kpa

2. Bromine is produced by reacting chlorine with bromide ions in sea water. What amount of bromine in grams is present in an 18.8 L sample of gas at 60KPa and  $140^\circ\text{C}$ ? Ans. 52.5 g

3. Find the mass of 6.2 L of He gas at STP. Ans.

4. Find the volume occupied by 7.2 g of nitrogen gas at SATP. Ans.

5. Find the number of moles of 28.6 litres of a gas at SATP. Ans.

6. Find the volume occupied by 2.1 mol of a gas at STP. Ans.

EXAM FORMAT

50% Multiple  
Choice

50% Problems